

Amendment A and Response dated October 29, 2003

U.S. Patent Application Serial No.: 09/937,609

Inventors: Neil Loxley et al.

Reply to Office Action Dated July 29, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented): An x-ray generator comprising an electron gun, electron focussing means, a target and electronic control means, wherein an area of the target on which the focussing means causes electrons from said electron gun to impinge comprises an x-ray source emitting an x-ray beam, the control means being adapted to control the electron focussing means so that the x-ray source on said target may be varied in size, wherein the control means includes a switching means to switch the electron focussing means between a first unfocused state in which the x-ray source has a first area upon action of the shutter and a second focused state in which the x-ray source has a second area smaller than said first area when the shutter is open.

2. (Previously Presented): The x-ray generator according to Claim 1, wherein said first area has a surface area at least twice that of said second area.

3. (Previously Presented): The x-ray generator according to Claim 1, wherein said first area has a surface area at least four times that of said second area.

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4. (Previously Presented): The x-ray generator according to Claim 1, wherein said first area has a surface area at least ten times that of said second area.

5. (Cancelled):

6. (Currently Amended): The x-ray generator according to Claim 5, wherein Claim 1, wherein the electron gun comprises an evacuated tube, and wherein the electron focussing means comprises an x-y deflection system for centering the electron beam in the tube.

7. (Previously Presented): The x-ray generator according to Claim 6, wherein the electron beam focussing means further comprises at least one electron lens.

8. (Previously Presented): The x-ray generator according to Claim 7, wherein said electron lens comprises an axially symmetric or round lens for focussing the electron beam to a line focus and for steering the electron beam.

9. (Previously Presented): The x-ray generator according to Claim 7, wherein said electron lens comprises at least one quadripole or multipole lens for focussing the electron beam to a line focus and for steering the electron beam.

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10. (Currently Amended): The x-ray generator according to Claim 5, according to Claim 1, wherein the target is a metal selected from the group Cu, Ag, Mo, Rh, Al, Ti, Cr, Co, Fe, W, Au.

11. (Currently Amended): A method for extending the life of a target of an X-ray generator, wherein the generator comprises an electron gun, electron focussing means and a target, the method comprising the steps of:

firing electrons at the target such that the area of the target on which the focussing means causes electrons from said electron gun to impinge comprises an x-ray source emitting an x-ray beam; an x-ray beam;

controlling the emitted x-ray beam by action of a shutter in its path, and path; and

controlling the electron focusing means by action of the shutter to move between a first unfocused state in which the x-ray source has a first area and a second focused state in which the x-ray has a second area smaller than the first area, the intensity of electron impingement in the first state being sufficiently low to reduce target degradation, the intensity of electron impingement in the second state being sufficiently high such that the source produces a predetermined required level of brightness and source size on the target.

12. (Previously Presented): The method according to Claim 11, wherein the electron beam current is substantially the same in the first and second states, while the intensity of the beam per unit area at the target is lower in the first state than in the second state.

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13. (Currently Amended): A method for extending the life of a target of an x-ray generator, wherein the generator comprises an electron gun, electron focussing means and a target, the method comprising the steps of:

firing electrons at the target such that the area of the target on which the focussing means causes electrons from said electron gun to impinge comprises an x-ray source, and source; and
controlling the electron focussing means by action of a shutter to move between a plurality of focussed states, whereby in each state the x-ray source is in a corresponding discrete stationary position on said target, such that the intensity per unit area in each discrete position is substantially constant, and such that there is no overlap on the target between the discrete positions corresponding to each focussed state.

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Amendments to the Drawings:

The attached sheet of drawings includes changes to FIG. 1 to include the electronic switch control 50 and the shutter 51, which are completely and previously described in the Applicants' Specification. This sheet, FIG. 1, replaces the original sheet for FIG. 1.

Attachment: Replacement Sheet of FIG. 1.

Annotated Sheet Showing Changes.